(12) UK Patent Application (19) GB (11) 2 379 237 (13) A

(43) Date of A Publication 05.03.2003

(21) Application No 0120764.6

(22) Date of Filing 25.08.2001

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(51) INT CL[7]
E05F 1/00 // E05D 13/00

(52) UK CL (Edition V)
E1J JFA

(56) Documents Cited
GB 2262123 A
GB 0720858 A
US 2890480 A
US 2792588 A
US 2622267 A

(58) Field of Search
UK CL (Edition T) E1J JFA
INT CL[7] E05D 13/00 15/16 15/22, E05F 1/00 1/02, E06B 3/44
Other: Online: WPI, EPODOC, JAPIO

(54) Abstract Title
Spring balance adjustment for sash window

(57) To adjust the tension in a sash window spring balance, a first component 40 is mounted on the sash, and a second component 50,52 is mounted on the bottom end of the spring balance spiral rod 34. The first and second components have mating faces with ratchet teeth 62 arranged around an annulus centred around the spiral rod, so that when the rod is in tension pulling the first and second components against one another, the components can only rotate in one direction, and when they do rotate, there is a click produced each time the ratchet teeth ride over one another. A socket 66 in the base of the second component allows for a tool 64 to be inserted to rotate the component.

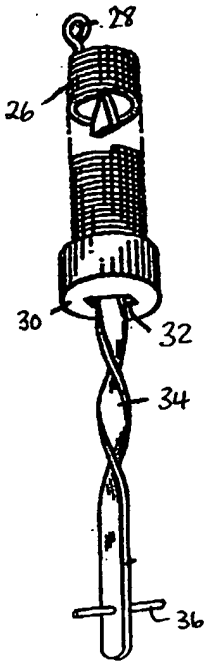

Fig.2

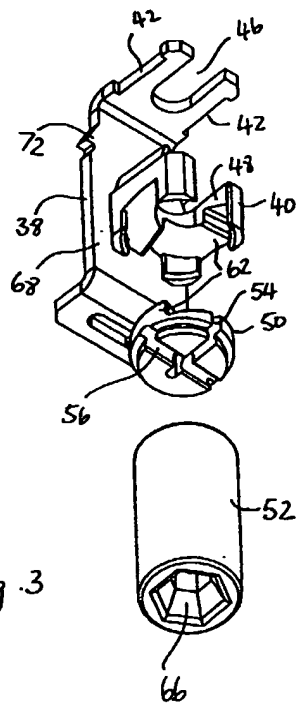

Fig.3

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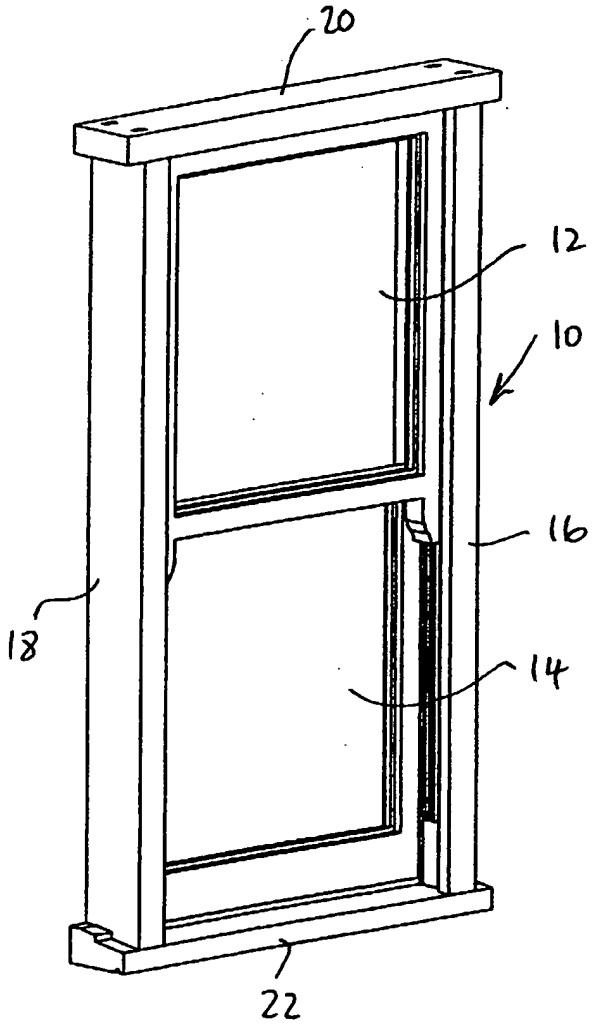

Fig. 1

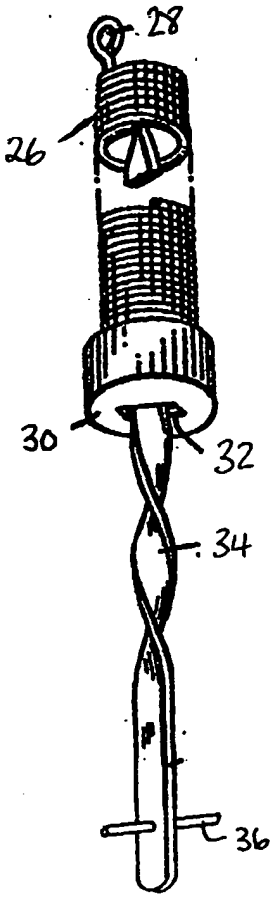

Fig. 2

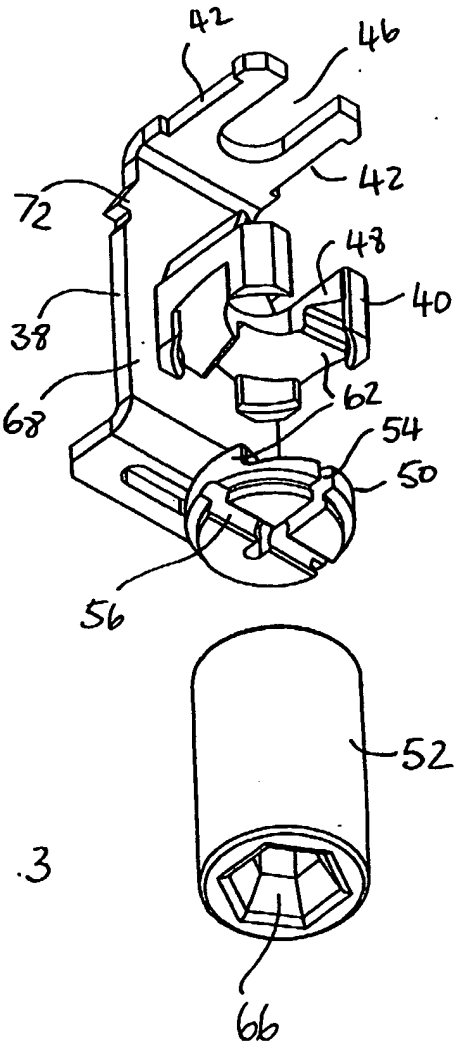

Fig. 3

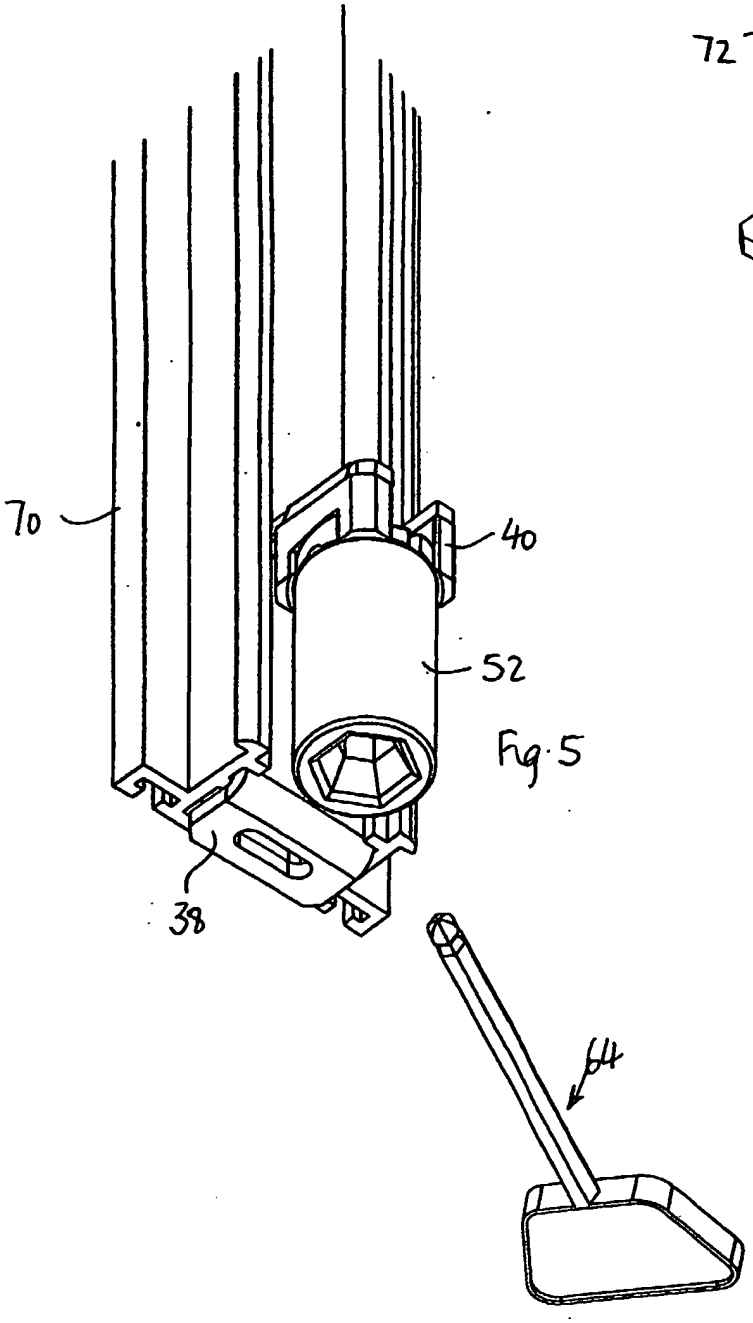

Fig. 5

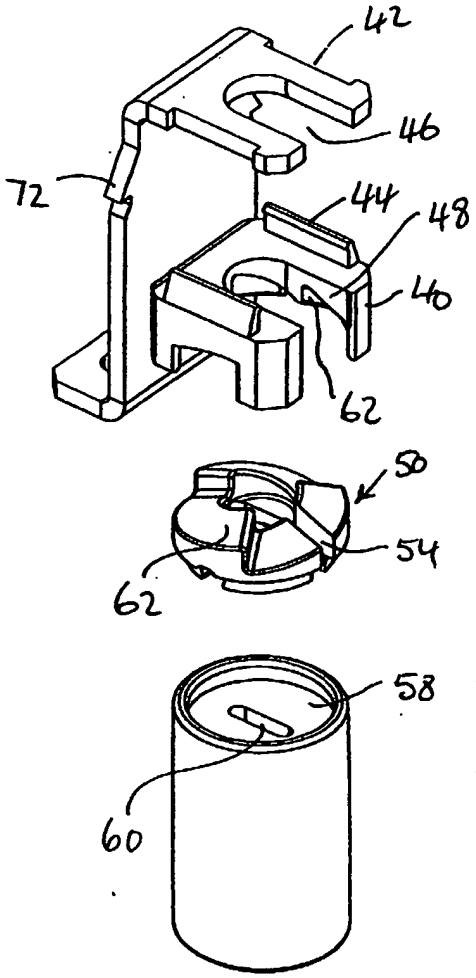

Fig. 4

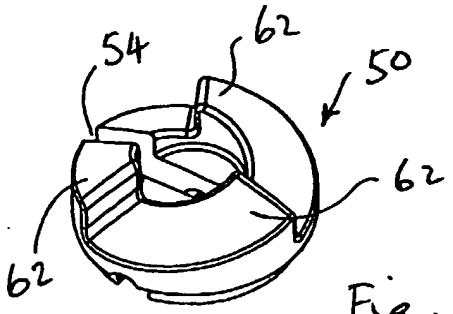

Fig. 6

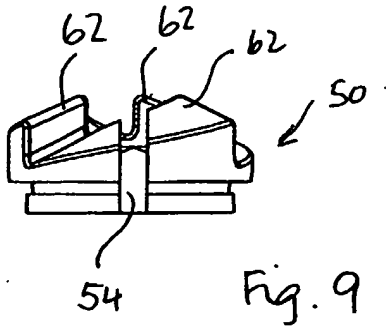

Fig. 9

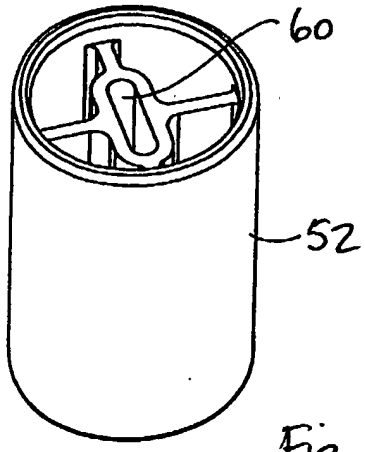

Fig. 7

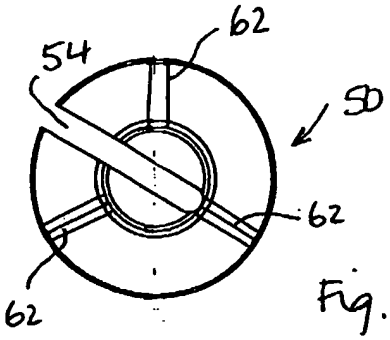

Fig. 10

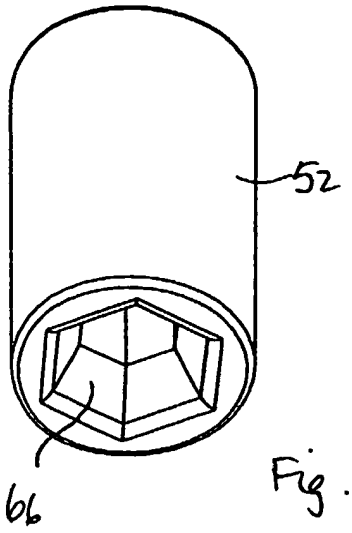

Fig. 8

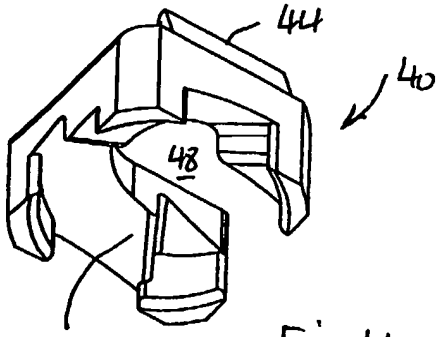

Fig. 11

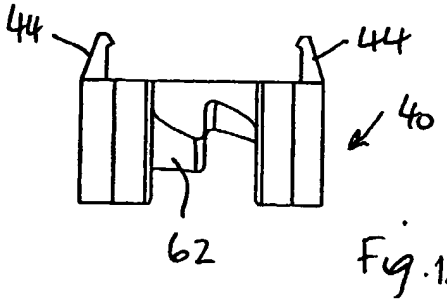

Fig. 12

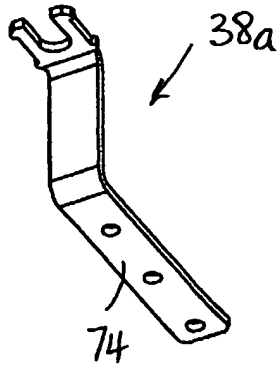

Fig. 13

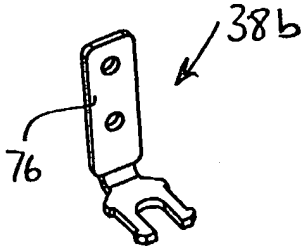

Fig. 14

Spring Balance Adjustment

This invention relates to the adjustment of spring balances, of the type used for supporting sash windows and shown, for example, in US-PS 1 864 745.

Spring balances are often used in sash windows, to support or counterbalance the weight of each window sash. A balance is fitted on either side of each sash. The balances work by winding up a helical spring which then produces a frictional engagement between two parts, one connected directly or indirectly to the frame and the other connected directly or indirectly to the sash. The friction is such that the sash will stay put in any position to which it is moved, but can be overcome, so that the sash can be moved, when pushed up or down by an external force. The tension in the springs in the balances have to be set in accordance with the weight of the particular sash being supported. The tension is adjusted by rotating a component of the balance which is to be connected to the sash, while that component is momentarily disengaged from the sash.

This rotation is difficult to do, because access to the relevant component is restricted by the adjacent parts of the window frame. Also it is difficult to adjust the balances on both sides of a window so that they are under equal tension. Still further, readjustment may be necessary after the window has been in use for a period of time.

The invention seeks to provide a mechanism which overcomes or reduces the difficulty of spring balance adjustment.

According to the invention, there is provided a spring

the assembled condition, with an operating key shown juxtaposed;

Figure 6 is a perspective view of part of a first component of the mechanism;

Figure 7 is a perspective view of another part of the first component;

Figure 8 is an opposite perspective view of the part shown in Figure 7;

Figure 9 is a side view of the part shown in Figure 6;

Figure 10 is a plan view of the part of the component shown in Figure 6;

Figure 11 is a perspective view of a second component of the mechanism;

Figure 12 is a side view of the component shown in Figure 11; and

Figures 13 and 14 show two alternative brackets for use with the mechanism.

Figure 1 shows a window which has a frame 10 containing two vertically slidable window sashes 12 and 14. The frame has vertical stiles 16 and 18, and top and bottom cross members 20 and 22. To enable the sashes 12 and 14 to be moved to any desired position, and to stay in the position in which they are placed, the weight of the sashes is counter-balanced by spring balances housed in the vertical stiles 16 and 18. Each sash 12, 14 will be

can transmit torque to the recess even when it is out of line with the axis of the recess.

A first part of the second component preferably carries the ratchet teeth and the second part preferably has a slot which non-rotatably receives the end of the rotatable member.

The rotatable member is likely to be a spiral member formed from a flat strip twisted about its axis.

The first and second components can be plastics mouldings and the first component can be connected to the sash through a metal bracket. Alternatively, the components can be metal die castings.

The invention will now be further described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a perspective view of a sash window;

Figure 2 is a perspective view, partly broken away, of a typical conventional spring balance to which this invention applies;

Figure 3 is an exploded view of a spring balance adjustment mechanism in accordance with the invention;

Figure 4 is a second exploded view of the mechanism in Figure 3, taken from a different perspective;

Figure 5 shows the mechanism of Figures 3 and 4 in

The construction of the spring 26 and, the manner with which it is secured to the frame form no part of this invention.

Figure 3 shows a bracket 38 to be attached to the sash, and a first mechanism component 40 to be permanently attached to the bracket 38. The bracket 38 will normally be of metal whereas the component 40 will be a plastics moulding. The bracket 38 has two lateral relieved portions 42, and the component 40 has ears 44 which can snap onto the relieved portions 42 to hold these two parts together. The bracket 38 and the component 40 both have a U-shaped opening 46, 48 which is large enough to allow the spiral member 34 to pass through this opening and to rotate within the opening without restriction.

The other component of the mechanism consists of two plastics moulded parts 50, 52. The part 50 has a slot 54 through which the flat of spiral member 34 can pass, and a transverse groove 56 in which the pin 36 can sit. The part 50 can therefore be placed over the spiral member 34, above the pin 36.

The other part 52 of the second component (see Figure 4) has a dished region at the top at 58 with a slot 60 into which the bottom end of the spiral member 34 can extend. The part 52 is a snap-fit onto the underside of the part 50, so that when the part 50 is fitted over the spiral member 34 and the part 52 is snapped onto the part 50, the pin 36 is enclosed, and the combined parts 50, 52 can be rotated to rotate the spiral member and to set the tension in the spring 26.

The underside of the first component 40 and the upper face

connected to a spring balance on both sides, such that there will be four spring balances used in the window of Figure 1, two in each of the stiles 16, 18.

Spring balances designed for this application are well known. A number of different forms exist, but they all have in common a tubular section including a helical spring, and a spiral member which passes through a slot attached to the spring. A simple form of spring balance is shown in Figure 2. This figure shows a spring 26 which is to be anchored at 28 to the window frame. At the bottom of the spring 26 there is a collar 30 with a rectangular slot 32. A spiral member 34, twisted from a flat bar, passes through the slot 32 and up the centre of the spring 26. The cross-section of the slot 32 is such that the flat bar can only pass through the slot when the long dimension of its cross-section is aligned with the slot. The spiral member 34 can therefore move up and down relative to the spring, through the slot 32, but when the upper end of the spring is fixed at 28, and the lower end of the spiral member is prevented from rotating, the spiral member can only move out of the spring by forcing the collar 30 to rotate, which has the result of winding up the spring 26. When in use, the upper end of the spring 26 is fixed to the window frame, and the lower end of the spiral member 34 is fixed to the sash. As the sash is moved up and down, the spiral member 34 moves in and out of the spring, producing corresponding rotation of the collar 30 and thus winding up/unwinding of the spring, to vary the tension of the spring and thus the force resisting movement of the spiral member out of the spring.

It will be seen in Figure 2 that the bottom end of the spiral member 34 has a lateral pin 36 to assist in setting the tension in the spring, in a manner to be described.

Rotation of the component 50, 52 is achieved by inserting a key 64 in a socket 66 on the base of the component 50, 52. Because the flat part of the bottom of the spiral member 34 engages in the slot 60, rotation of the part 52 will produce rotation of the spiral member 34, and because the bracket 38 limits the vertical movement of the pin 36 and the spiral member 34, this will result in tension being placed in the spring 26.

The recess 66 is designed (here as an hexagonal socket) with a flared entry, so that the tool 64 can apply the necessary torque from an off-axis position. The end of the tool 64 has a rounded end and this, together with a flared entry to the recess 66, ensures that the tool can easily be brought into driving engagement in the recess. It is noted that access to this recess is often very difficult, because at the time that this adjustment is made, all the components are installed in one or other of the stiles 16, 18 of the frame 10.

Figure 5 shows part of an installation in a sash window of the type shown in our co-pending application entitled 'Sash Windows' Application No GB0120762.0 filed on the same date as the present application (agents reference P/3057.A2). In this installation, the bracket 38 has a leg 68 which slides inside a track in a plastic extrusion 70, and the window sash is connected (by components not shown in Figure 5) to the extrusion 70 which slides up and down in the frame with the sash. The bracket 38 has tangs 72 which bite into the walls of the extrusion 70 to prevent unintended separation between the bracket 38 and the extrusion 70.

However, the mechanism is not restricted to this type of

of the second component 50 have annular mating surfaces with ratchet teeth 62 thereon. In the embodiment shown there are three teeth on each of these two components, but there could be a different number of teeth, for example four. The mating surfaces are arranged so that as the second component 50, 52 is turned to increase the tension in the spring 36, the teeth on the component 50 ride over the (stationary) teeth on the component 40 to (a) prevent unintended rotation in the opposite direction, and (b) to provide a positive indication by feeling each 'click' of the extent to which this spring has been wound up.

The teeth are arranged on conical surfaces on the components 40,50 to provide a self-centring action to assist the components in engaging correctly with each other.

In practice, when a sash window is installed for the first time, the sashes are lifted to their highest position in the frame 10, and are chocked there by any suitable temporary chock. The bracket 38 will at this stage be fitted on the sash, and the first component 40 of the mechanism will be clipped onto the bracket 38.

The parts 50 and 52 will then be fastened on the lower end of the spiral member 34 and will be rotated until the teeth 62 on the first and second components come into contact with one another. Rotation of the component 50, 52 will then proceed by adding a specified degree of rotation, identified by the number of 'clicks' to place the necessary pretension in the spring 26. The necessary pretension will be that which holds the sash in its uppermost position once the temporary chock has been removed, but which allows the sash to be pulled to its lowermost position without undue force being required.

Claims

1. A spring balance adjustment mechanism for adjusting a spring balance in a sash window assembly, the mechanism comprising a first component to be non-rotatably fitted to a window sash and a second component to be fitted to a rotatable component of a spring balance which balances up and down movement of the sash, so as to rotate with the rotatable component, wherein the two components have mutually engaging ratchet surfaces which allow relative rotation between the components in one direction but not in an opposite direction, and the second component has means by which a tool can be engaged with the component, to rotate the second component.

2. A mechanism as claimed in Claim 1, wherein the second component consists of two parts, adapted to fit respectively above and below a feature on the rotatable component of a spring balance and then to lock together, so that the second component is held on the rotatable component, for rotation with the rotatable component.

3. A mechanism as claimed in Claim 1 or Claim 2, wherein the ratchet surfaces are arranged around the axis of the rotatable component of the spring balance.

4. A mechanism as claimed in any preceding claim, wherein the ratchet surfaces are arranged around mating conical surfaces on the first and second components.

5. A mechanism as claimed in Claim 4, wherein the first component has a concave conical surface and the second component has a convex conical surface.

6. A mechanism as claimed in any preceding claim,

bracket, and Figures 13 and 14 show alternative brackets, Figure 13 shows a bracket 38a with a fixing shoulder 74 which can be screwed to the under-face of the lower sash in a suitable rebate formed in the sash under-face. Figure 14 shows a bracket 38b with an arm 36 which can be inserted in a track formed on the outer edge of an upper sash. In both cases, screw holes are provided through which brackets 38a, 38b can be permanently fixed to the respective sashes.

The mechanism first of all, makes it easy to accomplish adjustment, as the insertion of the tool 64 into the recess 66 can be achieved at any angle, and the flaring entry to the recess ensures that the operative end of the tool can easily be seated in the driving part of the recess.

Secondly, the use of the mating ratchet teeth 62 means that the tension in the spring balances can be set to the correct design level by winding up the spiral member 34 until the teeth first begin to click, and then continuing to rotate by a specified number of clicks. The same number of clicks can easily be applied on both sides. Furthermore, if adjustment of the balances is required later in the life of the window, it is easy to increase the tension by a specified number of clicks with the same number of clicks being applied on both sides of the window. The embodiment described here thus overcomes particular disadvantages of existing mechanisms for adjusting sash window balances.

wherein the means by which a tool can be engaged with the second component comprises a non-round recess in the base of the second component.

7. A mechanism as claimed in Claim 6, wherein the recess is hexagonal in form and has an outwardly flared lead-in region for directing the tool into the recess.

8. A mechanism as claimed in Claim 2, wherein the first part of the second component carries the ratchet teeth and the second part has a slot which non-rotatably receives the end of the rotatable member.

9. A mechanism as claimed in any preceding claim, wherein the rotatable member is a spiral member formed from a flat strip twisted about its axis.

10. A mechanism as claimed in any preceding claim, wherein the tool has a hexagonal cross-section tip with a rounded end.

11. A mechanism as claimed in any preceding claim, wherein the first and second components are plastics mouldings.

12. A mechanism as claimed in any preceding claim, wherein the first component is connected to the sash through a metal bracket.

13. A spring balance adjustment mechanism for adjusting a spring balance in a sash window assembly substantially as herein described with reference to the accompanying drawings.

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Application No: GB 0120764.6 **Examiner:** Alan Jones
Claims searched: 1-13 **Date of search:** 11 March 2002

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.T): E1J JFA

Int Cl (Ed.7): E05D: 13/00, 15/16, 15/22
E05F: 1/00, 1/02
E06B: 3/44

Other: Online: WPI, EPODOC, JAPIO

Documents considered to be relevant:

Category	Identity of document and relevant passage		Relevant to claims
X	GB 2262123 A	(NAKANISHI ENGINEERING) figs 6 and 7, pg 1 ln 11-14	1, 6, 9
X	GB 0720858 A	(DOWELL & SONS) figs 2 and 3, pg 1 ln 40-45	1, 6, 9
A	US 2890480 A	(GREGG ET AL)	
X	US 2792588 A	(GENCY) figs 1-5	1, 3, 6, 9
X	US 2622267 A	(PEREMI) figs 5 and 6	1, 3, 6, 9, 12

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

DERWENT-ACC-NO: 2003-213016

DERWENT-WEEK: 200321

TITLE: Spring balance adjustment mechanism, for sash window, has component which is rotated until teeth of both components come into contact, and has further rotations identified by number of clicks to place necessary pretension in spring

INVENTOR: DERHAM, M; HAWKER, M J

PATENT-ASSIGNEE: MIGHTON PROD LTD[MIGHN]

PRIORITY-DATA: 2001GB-0020764 (August 25, 2001)

PATENT-FAMILY:

PUB-NO	PUB-DATE	LANGUAGE	PAGES	MAIN-IPC
GB 2379237 A	March 5, 2003	N/A	018	E05F 001/00

APPLICATION-DATA:

PUB-NO	APPL-DESCRIPTOR	APPL-NO	APPL-DATE
GB 2379237A	N/A	2001GB-0020764	August 25, 2001

INT-CL (IPC): E05D013/00, E05F001/00

ABSTRACTED-PUB-NO: GB 2379237A

BASIC-ABSTRACT:

NOVELTY - Mechanism includes first component (40) and second component (50, 52)
mounted on bottom end of spring balance spiral rod (34) and rotated until teeth

(62) of both components come into contact with one another. Rotation of second component is then proceed by adding specified degree of rotation, identified by number of clicks to place necessary pretension in spring (26).

DETAILED DESCRIPTION - Necessary pretension will be that which holds the sash in its uppermost position once temporary chock has been removed, but which allows sash to be pulled to its lowermost position without undue force being required. Rotation of second component is achieved by inserting key in socket (66) on base of component. Because flat part of bottom of spiral rod engages in slot, rotation of part (52) produce rotation of spiral rod, and because bracket limits vertical movement of pin (36) and spiral rod, this will result in tension being placed in spring.

USE - For adjusting a spring balance in a sash window assembly.

ADVANTAGE - Reduces the difficulty of spring balance adjustment. Spring can transmit torque to the recess even when it is out of line with the axis of the recess.

DESCRIPTION OF DRAWING(S) - The first drawing shows a perspective view, partly broken away, of a typical conventional spring balance, and second drawing shows an exploded view of a spring balance adjustment mechanism.

Spring 26

Spring balance spiral rod 34

First component 40

Second component 50, 52

Teeth 62

Socket 66

CHOSEN-DRAWING: Dwg.2,

TITLE-TERMS: SPRING BALANCE ADJUST MECHANISM SASH WINDOW COMPONENT ROTATING
TOOTH COMPONENT CONTACT ROTATING IDENTIFY NUMBER CLICK PLACE
NECESSARY PRETENSIONED SPRING

DERWENT-CLASS: Q47

SECONDARY-ACC-NO:
Non-CPI Secondary Accession Numbers: N2003-169792